

What is claimed is:

1. A method for synchronizing distributed processors comprising the steps of:

5 determining a desired number of offset values between two processors, wherein each processor comprises a quartz crystal;

determining parameters of a regression line, wherein the regression line is a function of the offset values over the desired number of offsets; and

10 adjusting a synchronization interval according to the parameters.

2. The method of claim 1, wherein the desired number of offset values is thirty.

15 3. The method of claim 1, wherein the offset values are functions of a difference between relative inaccuracies corresponding to the quartz crystal of each processor.

20 4. The method of claim 1, wherein the step of determining the parameters further comprises the step of fitting a straight line,  $y = a + b \cdot x$  to a collection of  $N$  measurement pairs  $(y_i; x_i)$  with minimum mean square error, wherein  $a$  and  $b$  are the parameters.

5. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for synchronizing distributed processors, the method steps comprising:

5 determining a desired number of offset values between two processors, wherein each processor comprises a quartz crystal;

determining parameters of a regression line, wherein the regression line is a function of the offset values over the desired number of offsets; and

10 adjusting a synchronization interval according to the parameters.

6. The method of claim 5, wherein the desired number of offset values is thirty.

7. The method of claim 5, wherein the offset values are functions of a difference between relative inaccuracies corresponding to the quartz crystal of each processor.

15 20 8. The method of claim 5, wherein the step of determining the parameters further comprises the step of fitting a straight line,  $y = a + b \cdot x$  to a collection of  $N$  measurement pairs  $(y_i; x_i)$  with minimum mean square error, wherein  $a$  and  $b$  are the parameters.

9. A method for synchronizing distributed processors

comprising the steps of:

establishing a socket-connection between at least two

5 processors;

determining a roundtrip delay;

determining a roundtrip-delay threshold;

determining a current round-trip delay and an offset;

10 adding the current round-trip delay to a list of roundtrip delays;

determining a new roundtrip-delay threshold;

determining whether the current roundtrip delay is greater than the new threshold:

15 upon determining the current roundtrip delay to be greater than the new threshold, determining whether a desired number of round-trip delays have been determined;

upon determining that the current threshold is not greater than the new threshold, determining whether

20 the offset is greater than an offset threshold;

adjusting a clock according to an offset; and

determining a linear regression.

10. The method of claim 9, wherein a probability of the round-trip delay being greater than the roundtrip-delay threshold is about 0.5 and a probability of the round-trip delay being less than the roundtrip-delay threshold is about 0.5

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11. The method of claim 9, wherein the step of determining whether thirty round-trip delays have been determined further comprises the step of entering a synchronization method upon determining the desired number round-trip delays.

12. The method of claim 9, wherein the step of determining whether thirty round-trip delays have been determined further comprises the step of determining a current round-trip delay and an offset upon determining less than the desired number delays.

13. The method of claim 9, wherein the step of adjusting a clock according to an offset further comprises the steps of:

decrementing by an update-interval upon determining the offset to be greater than the offset threshold; and

incrementing by the update-interval upon determining the offset to be less than the offset threshold.

14. The method of claim 9, further comprising the step of determining, recursively, a current round-trip delay and an offset.

5 15. The method of claim 9, wherein the step of determining a linear regression further comprises the steps of:

setting a current synchronization time;

determining whether a number of measured offsets is greater than a desired number:

10 upon determining that the number of offsets is greater than the desired number, removing an oldest offset from a list of offsets and adding a current offset to the list and determining parameters of a regression line from the list of offsets;

15 upon determining that the number of measured offsets is not greater than the desired number, adding the current offset to the list;

estimating the current offset using the regression line;

incrementing the current synchronization time; and

20 determining whether the current synchronization time is greater than an update-interval:

upon determining the current synchronization time to be less than the update-interval, estimating the current offset using the regression line;

upon determining the current synchronization time to be greater than the update-interval, measuring a current roundtrip delay and offset.

5 16. The method of claim 9, wherein the desired number of roundtrip delays is thirty.

17. A system for synchronizing distributed processors comprising:

10 a first processor connected to a network, wherein the first processor sends a sync-request message comprising a time current local time of the first processor; and

15 a second processor connected to the network and connected to the first processor via the network, wherein the server receives the sync-request message, and stores a time of arrival of the sync-request message and sends a sync-response message the first processor, wherein the sync-response message comprises the current local time of the first processor, the time of arrival and a current local time to the second processor.